

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method for the production of an aromatic or hetroaromatic fluorine-labelled compound comprising fluoridation of an iodonium salt of Formula (I) or (II):



wherein:

Q is an electron deficient aromatic or heteroaromatic moiety;

each of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> is independently hydrogen, -O(C<sub>1-10</sub> alkyl) or C<sub>1-10</sub> alkyl; and

Y<sup>-</sup> is a counter ion such as trifluoromethane sulfonate (triflate), perfluoro C<sub>2</sub>-C<sub>10</sub> alkyl sulphonate, trifluoroacetate, methane sulfonate (mesylate), toluene sulfonate. (tosylate), tetraphenylborate;

to give a product of general formula (III):



where Q is substituted with one or more substituents selected from C<sub>1-10</sub> alkyl, -O(C<sub>1-10</sub> alkyl), -C(=O) C<sub>1-10</sub> alkyl, -C(=O)NR<sup>6</sup>(C<sub>1-10</sub> alkyl), -(C<sub>1</sub>-C<sub>6</sub> alkyl)-O-(C<sub>1</sub>-C<sub>6</sub> alkyl), C<sub>5-14</sub> aryl, -O(C<sub>5-14</sub> aryl), -C(=O)C<sub>5-14</sub> aryl, -C(=O)NR<sup>6</sup>(C<sub>5-14</sub> aryl, C<sub>5-14</sub> heteroaryl, -O(C<sub>5-14</sub> heteroaryl),

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Reply to Office Action of July 6, 2009

-C(=O)C<sub>5-14</sub> heteroaryl, -C(=O)NR<sup>6</sup>(C<sub>5-14</sub> heteroaryl), C<sub>3-10</sub> cycloalkyl, -O(C<sub>3-10</sub> cycloalkyl), -C(=O)(C<sub>3-10</sub> cycloalkyl), -C(=O)NR<sup>6</sup>(C<sub>3-10</sub> cycloalkyl), C<sub>3-10</sub> heterocyclyl, -O(C<sub>3-10</sub> heterocyclyl), -C(=O)(C<sub>3-10</sub> heterocyclyl), -C(=O)NR<sup>6</sup>(C<sub>5-14</sub> heterocyclyl) wherein, when Q is substituted with an electron donating substituent, Q also contains one or more electron withdrawing groups to ensure Q is electron deficient;

and wherein said fluoridation is carried out with a fluoride ion source characterised in that the reaction solvent is either 100% water or a mixture of water and a water miscible solvent.

2. (Cancelled)

3. (Cancelled)

4. (Previously presented) A method as claimed in claim 1, wherein the water miscible solvent is acetonitrile, ethanol, methanol, tetrahydrofuran or dimethylformamide.

5. (Previously Presented) A method as claimed in claim 1 wherein the volume:volume ratio of water:water-miscible solvent is between 1:99 and 1:1.

6. (Original) A method as claimed in claim 5 wherein the volume:volume ratio of water:water-miscible solvent is from 10:90 to 30:70.

7. (Previously Presented) A method as claimed in claim 1, wherein the fluoride ion source is potassium, caesium or sodium fluoride.

8. (Cancelled)

9. (Previously Presented) A method as claimed in claim 1, wherein each of R<sup>1</sup>-R<sup>5</sup> is independently selected from hydrogen, C<sub>1-3</sub> alkyl and -O-(C<sub>1</sub>-C<sub>3</sub> alkyl).

10. (Previously Presented) A method as claimed in claim 1 wherein, in the compound of Formula II, the “solid support” is polystyrene, polyacrylamide, polypropylene or glass or silicon coated with such a polymer.

11. (Previously Presented) A method as claimed in claim 1 wherein the solid support is in the form of small discrete particles or is a coating on the inner surface of a reaction vessel.

12. (Previously Presented) A method as claimed in claim 1, wherein, in the compound of Formula II the “linker” is  $C_{1-20}$  alkyl or  $C_{1-20}$  alkoxy, attached to the resin by an amide ether or a sulphonamide bond or a polyethylene glycol (PEG) linker.

13. (Previously Presented) A method as claimed in claim 1

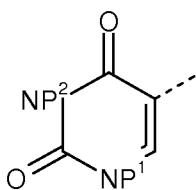
wherein  $R^6$  is H,  $C_1-C_6$  alkyl,  $C_3-C_{10}$  cycloalkyl,  $C_3-C_{10}$  heterocyclyl,  $C_4-C_{10}$  aryl or  $C_4-C_{10}$  heteroaryl;

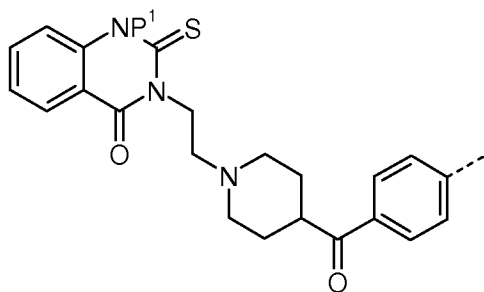
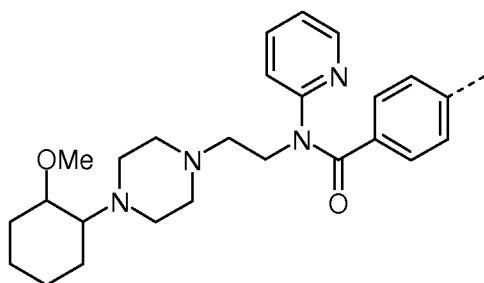
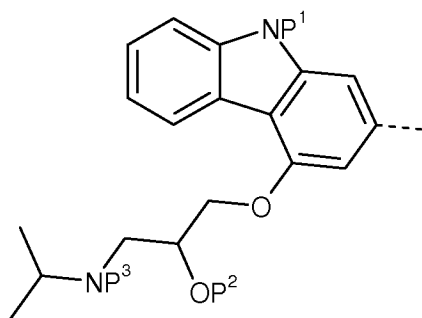
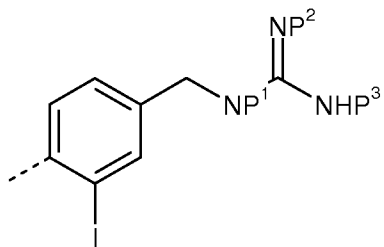
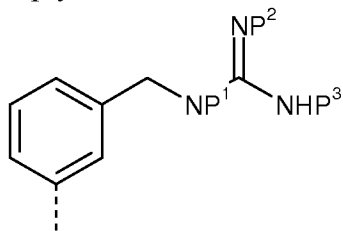
any of which may optionally be substituted with OH,  $NHR^6$ , COOH or protected versions any of these groups; or alternatively

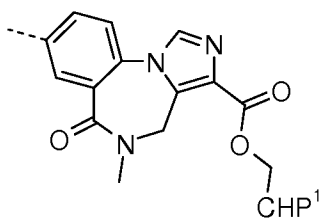
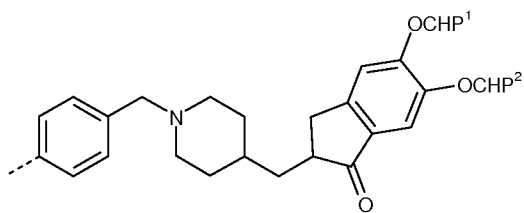
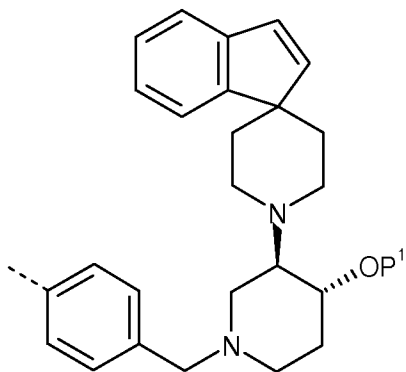
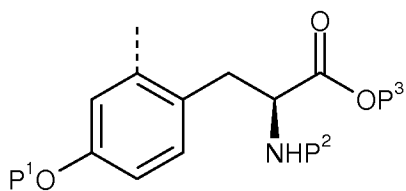
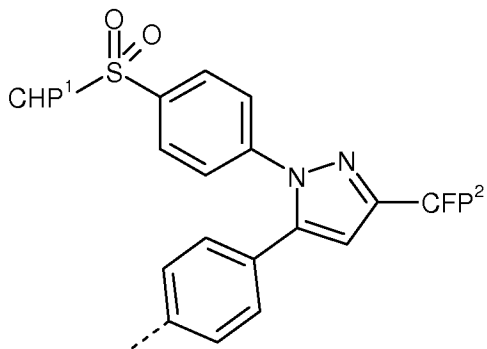
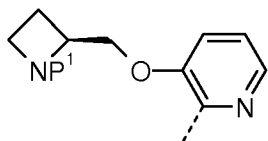
any two adjacent substituents may form a four- to six-membered carbocyclic or heterocyclic ring, optionally fused to a further aromatic, heteroaromatic, carbocyclic or heterocyclic ring.

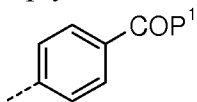
14. (Previously Presented) A method as claimed in claim 1, wherein the aromatic moiety Q has an additional substituent selected from OH,  $NHR^6$  or halogen.

15. (Previously Presented) A method as claimed in claim 1, wherein the group Q is one of the following:



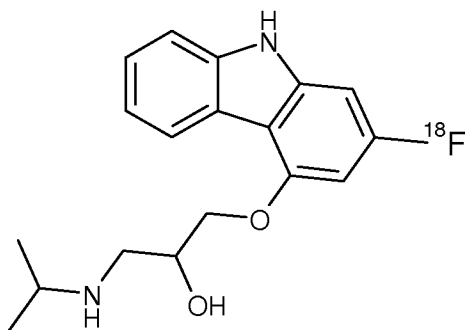
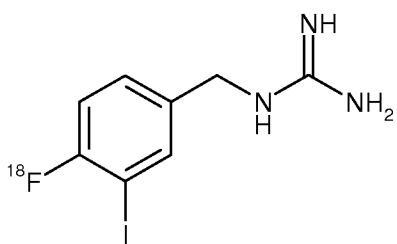
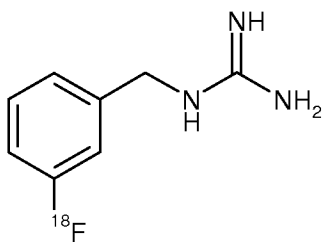
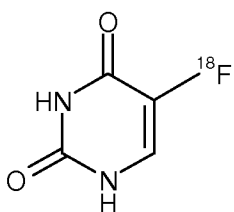


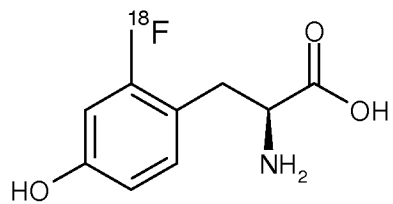
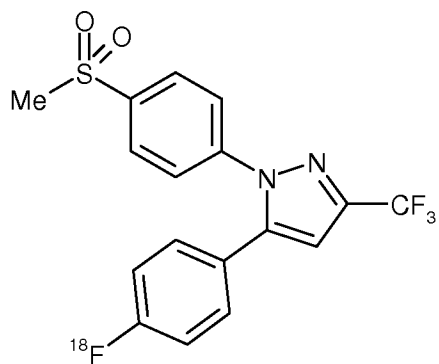
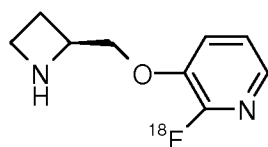
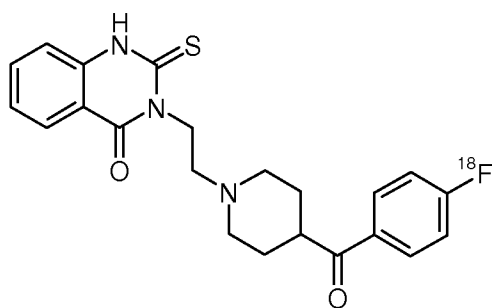
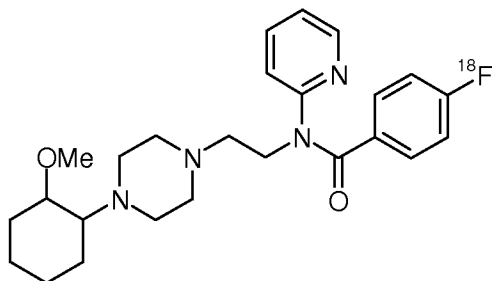


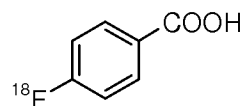
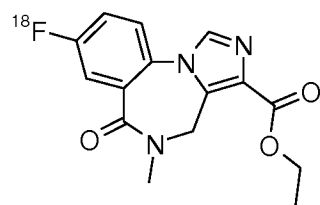
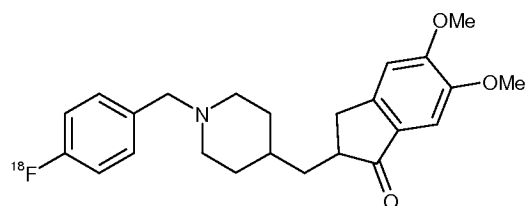


16. (Previously Presented) A method as claimed in claim 1, wherein the fluorine-labelled compound is an [ $^{18}\text{F}$ ]-labelled compound and the fluoride ion source is a source of  $^{18}\text{F}^-$ .

17. (Previously Presented) A method as claimed in claim 1, wherein the F-labelled compound is selected from the following:







- (i) removal of the protecting groups; and/or
- (ii) removal of organic solvent; and/or
- (iii) formulation of the resultant compound as an aqueous solution.

- (i) a vial containing an aqueous solvent for dissolving the fluoride ion source; and
- (ii) a reaction vessel containing an iodonium salt.



20. (Original) A kit as claimed in claim 19, wherein the solvent is 100% water.
21. (Original) A kit as claimed in claim 19 wherein the solvent is a mixture of water and a water miscible solvent.
22. (Original) A kit as claimed in claim 21, wherein the water miscible solvent is acetonitrile, ethanol, methanol, tetrahydrofuran or dimethylformamide.
23. (Previously Presented) A kit as claimed in claim 21 wherein the volume:volume ratio of water:water-miscible solvent is between 1:99 and 1:1.
24. (Original) A kit as claimed in claim 23 wherein the volume:volume ratio of water:water-miscible solvent is from 10:90 to 30:70.
25. (Previously Presented) A kit as claimed in claim 19 wherein the iodonium salt is compound of general formula (I) or (II).
26. (Previously Presented) A kit as claimed in claim 20 wherein the iodonium salt is a compound of general formula (II) and the solid support comprises a coating on the surface of the reaction vessel.
27. (Previously Presented) A kit as claimed in claim 19, wherein the reaction vessel is a cartridge or a microfabricated vessel.
28. (Previously Presented) A kit as claimed in claim 19, further comprising a source of fluoride ions.